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A Causal Model of the Effects of Maternal Employment on Adolescent Achievement

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ABSTRACT

Given the theoretical complexity of the processes underlying achievement, it is not surprising to find limited investigation of the relationships between maternal employment and adolescent academic performance. The High School and Beyond 1980 sophomores data was used to assess the impact of maternal employment on seven latent variables: number of siblings, sex role orientation, mother's influence in academic matters, personal/social self-concept, academic task confidence, educational/occupational aspirations, and achievement. The LISREL causal modeling technique permitted a more sophisticated and complete analysis of these variables than has been previously attempted. The results indicate that for sophomore middle-class females (1) the hypothesized model applied well to both maternally employed and nonemployed groups; and (2) differences in academic groups were insignificant although some of the other variables do indicate differential trends affected by maternal employment status.

A Causal Model of the Effects of Maternal Employment on Adolescent Achievement

Much has been written about the effects of maternal employment on adolescents, both from the standpoints of personal and familial adjustment as well as the impact on academic performance. Inasmuch as the working mother family pattern is now considered the modal family style, the question of whether women should or should not work is unrealistic. The significant problem to be addressed is the impact of such maternal employment.

Given the theoretical complexity of the processes underlying achievement, it is not surprising find limited investigation of the connections between maternal employment and adolescent academic performance. Hoffman (1980) states that some studies have examined this relationship but have not devoted enough attention to the intervening variables which are likely to have significance in determining children's achievement. Limiting conditions inherent in most studies of this type have prevented adequate examination of the various social, familial and personal linkages between the employment status of the mother and her children's academic behaviors. Such conditions include multiple related variables, contrasting operational definitions of constructs, the quantification of sociological data, and divergent sample subgroups.

In general, past research suggests the variables of sex and social class must be included as an intrinsic part of maternal employment research. Differential effects for sex and SES subgroups are indicated, and failure to analyze data for each subgroup separately may lead to false conclusions. For example, Woods (1972) found full-time maternal employment related to increased academic performance of black urban fifth grade children but

suggests that the motivation for such employment, the maintenance of the family's economic survival, may contrast with such motivations for middle class mothers. Typically, middle class maternal employment increase family income beyond the "survival" level and is linked to higher educational and occupational goals. Thus, socioeconomic status is indicative not only of family income, educational levels, and occupational attainments but may also be evincive of maternal attitudes toward work and job satisfaction, all of which have profound impact on family structure and functioning.

In exploration of the conditions of parental employment and the connection with school behaviors in children, Piotrkowski & Katz (1982) demonstrated an indirect socialization effect. Occupational conditions associated with particular job types were significantly associated with attendance, effort, and achievement behaviors of school children in the family. (For example, parents' job demands were positively related to the academic productivity of children.) Since parental work experiences differ substantially by social class, such an analysis supports the concept of differential effects by class.

Additionally, association between child-rearing practices and social class have been empirically established (Gecas, 1979). Social class differences in attitudes and actions of parents towards their children are reflected in the values instilled in those children. These values become internalized by offspring and influence school behavior.

Sex differences regarding children of the maternally employed are in part explained by a change in family structure. Stereotyped traits normally associated with parental role are often modified for maximization of functional efficiency. School-aged children are more likely to engage in household tasks (Hoffman, 1979) and are encouraged to be more independent

(Propper, 1972). Daughters of working mothers, in particular, hold less stereotypic views of sex role which is a critical factor in the role-modeling process (Marantz & Mansfield, 1974).

Two income families, in general, increase a daughter's perception of her mother's academic and occupational competency. Daughters of working women are more likely to admire their mothers (Baruch, 1972) as well as perceive females as being competent. Daughters of employed women are also inclined to have less traditional attitudes toward work and have significantly higher career aspirations (Tangri, 1972).

Due to society's diminishing status accorded the homemaker/mother role, full time mothering may actually have an adverse effect on childrearing. Nonemployed women devote more time, energy, and psychological commitment to the mothering role. Moore (1975) and Birnbaum (1975) suggest such mothering puts children at a disadvantage within the context of modern social interaction, and that boys in particular suffer from inadvertent dependency, conformity, inhibition, and fearfulness.

Another hypothesis which may partially account for sex-related differences among children of employed women is that female breadwinners generally undermine the traditional male role and the need to achieve. Existing data do not seem to support such a conjecture, though such studies have been widely inconsistent (Hoffman, 1980). Sons of working women do see women in general as being more competent but do not view men as being less so (Gold & Andres, 1978b). If competence and family earning power are not viewed as being exclusively male, there may be less pressure on boys to achieve. Therefore, in maternally employed families, the father-son role modeling relationship may be becoming less intense, while the mother-daughter relationship may be increasing in significance.

Various factors other than sex and social class complicate the effects of maternal employment on adolescents. Size of family, especially the number of siblings who compete for maternal attention, puts limitations on the tenuous balance between the employment and household responsibilities of the working mother. The mother's influence per se extends not only to personal and social self-concept formation but also to academic matters.

A unique opportunity to expand study of these relationships presents itself in the form of the High School and Beyond (HSB) data of 1980. The construction of a theoretical causal model which takes advantage of the rich data, especially in the consideration of multiple indicator measures of latent variables, provides new insights into the effects of maternal employment. The model includes fifteen indicator variables (observable measures) and six latent variables which represent these hypothetical constructs: number of siblings, sex role orientation, mother's influence in academic matters, person/social self-concept, academic task confidence, and educational/occupational aspirations, all of which have been indicated to be influenced by maternal employment, and, in turn, to be influential in the determination of academic achievement. The purpose of this study is to test such a model so as to (1) ascertain whether the model adequately accounts for relationships among variables, both among maternally employed and nonemployed groups; and (2) assess the effect of employment status on each of the variables including achievement.

Method

Initially, the sample consisted of all 14,511 sophomores who participated in the 1980 High School and Beyond study (NORC, 1980). The

sample was then restricted by progressively extracting limiting subgroups, i.e., females, middle socioeconomic class, full-time employed mothers, or full-time nonemployed mothers. For the purposes of analysis, the maternally employed group (N = 306) consists of only those female, middle class sophomores whose mothers have worked full-time since the daughters were of preschool age. Similarly, the maternally nonemployed group (N=251) consists only of those girls whose mothers have been full-time homemakers. The effects of part-time employment or of sporadic employment were purposely eliminated from the study to eliminate any confounding effects.

The linear structural relationship model (LISREL) as defined and developed by Jöreskog (1978) was utilized to analyze the hypothesized model. The LISREL model consists of two parts: (1) the structural equation model which describes causal relationships between the seven latent variables previously mentioned, and (2) the measurement model which describes the measurement of each latent variable by its indicators, the students' response items selected from the HSB data set. The LISREL V computer program (Jöreskog & Sörbom, 1981) also permits the analysis of multiple groups classified by mother's employment status. Initially, the models for each group were analyzed separately. Then both groups were analyzed simultaneously to estimate the effects of maternal employment.

A theoretical model of those variables most likely to be influenced by maternal employment status is shown in Figure 1. A specific temporal order is suggested by the positioning of the variables in the model. Those variables which would be affected most immediately by the mother's employment status would be those directly influenced by constraints on maternal time and energy, thus impinging on the quality and nature of the mother-daughter relationship. These three variables, number of siblings,

sex role orientation, and mother's influence in academic matters, are hypothesized to affect those other variables which can be considered as representative of long-term effects of maternal employment.

Insert Figure 1 About Here

The first step in the data analysis involved the selection and recoding of those HSB variables which could be utilized in the model. These recodings are described in Tables 1 and 2. One of the advantages of structural equation modeling is the use of multiple indicators which minimizes measurement error. Better measurement of latent variables is attained than if only one measure is available. In this way one need not assume an error-free indicator. The only exception to multiple indicator use in the maternal employment model is the variable for the number of siblings. A composite variable consisting of six questions relating to ages numbers of brothers and sisters was derived and would be expected to reflect minimal error.

Means and variance-covariance matrices by maternal employment status were calculated (Table 3). Although the structural equation model assumes that indicator variables are measured on a continuous interval scale, categorical variables may be used if the number of categories is four or greater, and skewness does not exceed 2.0. Resultant estimates of these variables is not inordinately affected (Lomax, 1983a).

Insert Tables 1, 2, and 3 About Here

Computerized analysis using the LISREL V methodology as outlined by Jöreskog and Sörbom (1981), Lomax (1982), and Lomax (1983b) allows for a series of hierarchal models to be tested and compared for "goodness-of-fit." First, the proposed model is tested for each group. Then the best-fitting model is analyzed for both groups simultaneously.

Analysis and Results

Single Samples

Model #1 was a null model in which only measurement error terms are estimated for each indicator. This model, in effect, tests for the possibility of no causal relationships between latent variables.

Model #2 was a full LISREL model in which all hypothesized relationships among latent variables are estimated. A summary of these two single sample methods is given in Table 4 which gives chi-square values, degrees of freedom, and an overall goodness-of-fit index (Δ) which permits direct comparison of the models. As there were no indications of model misspecification, Model #2 was accepted as being theoretically plausible. Model #2 fits the data well for both groups. The normed fit index values of .902 and .900 indicate a substantial improvement over the null model.

Insert Table 4 About Here

LISREL estimates as shown in Table 5 are maximum likelihood estimates rather than ordinary least squares and as such reflect possible measurement error. Inspection of the estimates for the measurement portion of the model indicate that the relative weights of the estimates are consistent across

the two groups, and thus that the importance of the measurement itself does not differ due to maternal employment status. All factor loadings for both groups were significant ($p < .01$) with the exception of self-concept. Self-concept was not significant for the maternally employed group, but was retained in the model due to its significance for Group 2.

Of particular importance, the structural coefficients indicate the significance and the direction of relationships among the latent variables. The results were similar for both samples with two exceptions: (1) the effects of the number of siblings on personal/social self-concept were in opposite directions for the two groups (The latent variable personal/social self-concept consists of two indicators, a self-concept composite scale score and a locus-of-control scale score.) Directional estimates indicate that an increase in number of siblings influenced self-concept negatively for the maternally nonemployed group but positively for the employed group. (2) In several instances, significant relationships were indicated for Group 2 only. Educational/occupational aspirations were negatively affected by the number of siblings; academic task confidence loaded negatively on academic achievement; and educational/occupational aspirations loaded positively on achievement. Figure 2 indicates all significant relationships ($p < .05$) for the latent variables as well as the direction of relationship.

Insert Table 5 and Figure 2 About Here

Multiple Samples

LISREL's multiple sample analysis procedure allows the imposition of particular equality constraints across groups or samples. Thus one can test

for the possibility that certain portions of the measurement and structural models are in fact statistically equal between groups. This type of assessment will in effect allow future corroboration that differences between groups are actually due to group membership rather than other confounding differences. Model #1 is a null model which tests for the equality of measurement error or uniqueness terms. Like the single sample null model, this model assesses for the possibility of no causal relationships, but analyzes both groups simultaneously. Model #2 was a test of the equality of the variance-covariance matrices which, in effect, hypothesizes "no difference" between groups. As can be seen in Table 6, chi-square is now a measure of the model fit in both samples concurrently. Model #2 provides a very good overall fit, which is confirmed by the decrease in chi-square as well as the normed fit index value of .874. In summary, the complete measurement and structural models are statistically equivalent for both groups. Such a finding is consistent with the single sample estimates.

Insert Table 6 About Here

The final model analyzed was Model #3, a structural means model in which the equalities were taken into account and the effects of maternal employment status assessed more directly. In the structured means model two new sets of parameters are introduced. First, the mean of each indicator variable is estimated. These means are comparable to constant intercept terms for each variable and provide checks on the "equality" of the variable distributions. Second, for each structural equation and for the three independent latent variables, an effect due to group membership is

estimated. These estimates indicate effects in favor of the maternally employed group and in favor of the nonemployed group.

Model #3 essentially confirmed the general results of previous models; differences between the maternally employed and nonemployed groups were minimal. When prior variables in the model were controlled for, effects in favor of the maternally employed group were indicated for academic task confidence, educational/occupational aspirations, and achievement, but the results were statistically insignificant ($p < .05$). Daughters of nonemployed mothers had higher self-concepts and also had more siblings but these results were also not significant. The remaining two latent variables, sex role orientation and mother's influence in academic matters, were statistically different due to maternal employment status: (1) daughters of employed women possess a higher degree of non-traditional sex role orientation; and (2) daughters of full-time homemakers are substantially more influenced by their mothers in terms of academics.

Interpretations

Visual inspection of group means as presented in Table 3 tells little about the effects of maternal unemployment status. Not only are such means subject to gross measurement error, but also mean differences become difficult to analyze and interpret in light of the complexity of variable interaction.

Single sample (LISREL) analyses however begin to detect some likenesses and differences between groups and aid in accounting for the intricate relationships among hypothetical constructs. Significant coefficients as estimated by the full single sample model indicate the following:

(1) The number of siblings competing for maternal attention may have a negative impact on personal/social self-concept for daughters of working women. This conjecture seems reasonable since the limited time working mothers can spend with children must be divided among family members. More brothers and sisters implies less maternal contact per child and possible lowered self-concept.

(2) Non-traditional sex role orientation for young adolescent females overall may affect self-concept and educational/occupational aspirations positively. It seems logical that such orientation may offer an expansion of personal choices and outlets rather than being bound by role stereotypes. Daughters then may be influenced by maternal employment status but may still feel less restricted in fulfilling individual needs and goals.

(3) A mother's influence in academic matters is important in terms of present self-concept and classroom confidence as well as future career and educational goals. This finding is not unexpected since the maternal role is vital to juvenile development regardless of employment status or particular characteristics of individual mother-daughter relationships.

(4) High personal/social self-concept results in higher academic achievement.

LISREL's structured means analysis further identifies differences due directly to maternal employment status. Thus, when controlling for the other variables in the model, there are no differences in self-concept, academic task confidence, and educational/occupational aspirations, or

academic achievement. The significant nontraditional sex role orientation evidenced by the maternally employed group may be due to alterations in role-modeling processes and adaptations in traditional behaviors by both mother and father in order to increase family functioning and stability.

As stated previously, the structured means analysis indicates that the mother's influence in academic matters is higher for daughters of nonemployed women, and this may be a result of the higher degree of maternal contact. The nature of mother-daughter interaction may be more direct and pervasive, while for employed mothers, expectations of daughters may be indirect or less salient.

In conclusion, analysis of the processes underlying achievement for daughters of the maternally employed and non-employed reveal few significant differences. Generally, the sophomore females in this study were indicative of some differential trends in sex role attitudes and family structure, but these discrepancies cannot account for any disparities in academic achievement. Thus, if future studies should indicate achievement differences between the two groups, factors other than those presented here should be investigated.

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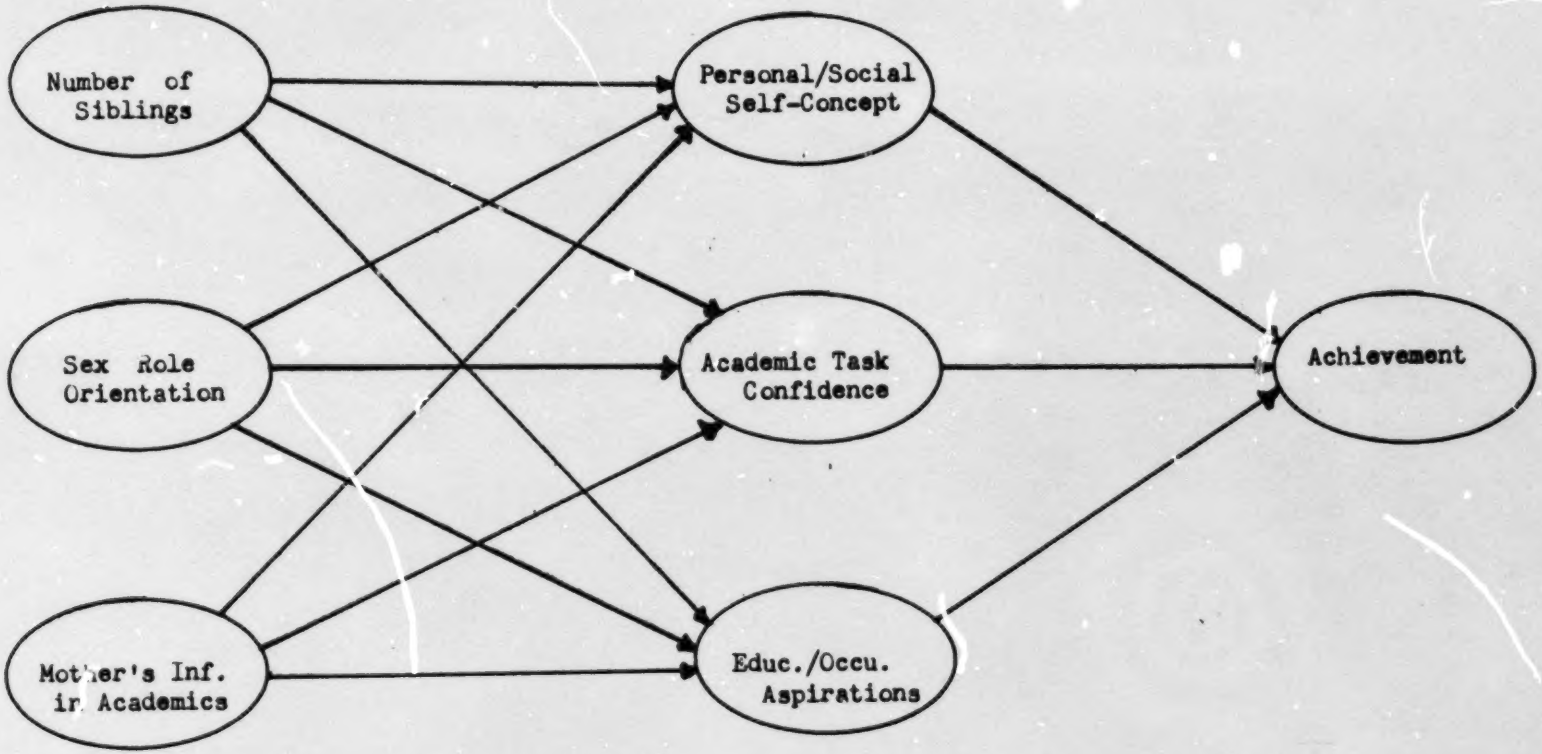

Figure 1. A Theoretical Model of the Effects of Maternal Employment

Table 1

Variable Description

*Latent Variable (Composite Variable)	-	Number of Siblings
Indicator Label		Indicator Variable Name
BB096A		No. siblings 3 or more yrs older
BB096B		No. siblings 1-2 yrs older
BB096C		No. siblings same age
BB096D		No. siblings 1-2 yrs younger
BB096E		No. siblings 3 or more yrs younger
*Latent Variable	-	Sex Role Orientation
Indicator Label		Indicator Variable Name
YB063B		Reaction Statement: man achieves, woman keeps house.
YB063C		Reaction Statement: a woman is happiest in the home.
*Latent Variable	-	Mother's Influence in Academic Matters
Indicator Label		Indicator Variable Name
BB066		Schooling mother wants you to get
BB050B		Mother's after high school plans for you
*Latent Variable	-	Personal/Social Self-Concept
Indicator Label		Indicator Variable Name
BBCONCPT		Self-Concept composite
BBLOCUS		Locus of control composite
*Latent Variable	-	Academic Task Confidence
Indicator Label		Indicator Variable Name
YB035A		At ease - English class
YBo35E		At ease - Math class
*Latent Variable	-	Educational/Occupational Aspirations
Indicator Label		Indicator Variable Name
BB062		Occupational aspirations - Age 30
BB067		Lowest schooling satisfied with
*Latent Variable	-	Achievement
Indicator Label		Indicator Variable Name
YBVOCBRT		Vocabulary
YBREADRT		Reading
YBMTH1RT, YBMTH2Rt } composite		Math
YBSCINRT		Science

Table 2

Variable Recoding

Variable Name	Recoding
Man achieves, woman keeps house	agree strongly = 0; agree = .25; disagree = .75; disagree strongly = 1.0.
A woman is happiest in the home	agree strongly = 1.0; agree = .75; disagree = .25; disagree strongly = 0. (Low scores indicate nontraditional opinions.)
Schooling mother wants you to get Lowest schooling satisfied with	Less than high school = 11; high school graduate = 12; Post-high school and less than 2 yrs schooling (any) = 13; Post-high school and 2 years = 14; college graduate = 16; master's degree = 18; professional degree = 19.
Mother's after high school plans for you	college = 2; job, trade school or military = 1; 0 = she doesn't care.
Self-concept composite	scale: high self-concept = low score; low self-concept = high schore.
Locus of control composite	scale: internal = high score; external = low score.
At ease - English class At ease - Math class	yes = 1; no = 0.
Occupational aspirations Age 30	clerical = 43.5; craftsman = 36.4; farmer = 44.0; homemaker = 41.0; laborer = 21.5; manager = 53.3; military = 49.5; operative = 32.4; professional 1 = 56.5; professional 2 = 72.8; proprietor = 48.3; protective service = 44.8; sales = 42.3; school teacher = 60.5; service = 29.2; technical = 52.0; not working = 41.0 (Mean ratings of occupational category, taken from Standard Index of Occupational Prestige)
Achievement Measures-Vocabulary, Reading, Math, Science	Number right

Table 3

Variable Means and Variance Covariance Matrices
by Maternal Employment Status

Indicator Variable	Employed	Nonemployed
1 - Number of siblings	2.940	3.119
2 - Man achieves, woman keeps house	.355	.485
3 - Woman happiest in home	.456	.490
4 - Schooling mother wants you to get	15.70	15.13
5 - Mother's after high school plans for you	1.77	1.66
6 - Self-concept composite	-0.005	.060
7 - Locus of control composite	-0.006	.153
8 - At ease - English class	.792	.827
9 - At ease - Math class	.647	.687
10- Occupational aspirations - age 30	51.549	50.527
11- Lowest schooling satisfied with	13.399	13.306
12- Vocabulary	10.089	11.805
13- Reading	8.548	9.815
14- Math	16.946	20.046
15- Science	9.826	11.145

Table 3. (continued)
Maternally Employed

1	.526														
2	-.034	.451													
3	.034	.049	.165												
4	-.043	.014	.002	.229											
5	-.196	.194	.053	.079	3.197										
6	-1.056	1.974	.359	.688	8.627	145.289									
7	.192	.918	.229	.032	.783	10.692	17.685								
8	.142	.792	.195	.122	.960	8.837	9.890	12.750							
9	.131	1.303	.131	.332	1.487	19.009	15.637	14.083	38.463						
10	.261	.787	.116	.133	.608	7.166	9.276	7.858	14.338	12.484					
11	.228	-.246	.024	-.101	-.315	-2.761	-2.302	-1.078	-1.865	6.580					
12	-.005	-.047	-.001	-.006	-.064	-.601	-.247	-.201	-.361	-.207	.132	.098			
13	-.023	-.049	-.003	-.007	-.016	-.488	-.368	-.320	-.491	-.334	.119	.048	.102		
14	-.034	.042	.020	.018	.215	1.507	.132	.192	.307	.112	-.026	-.002	-.010	.229	
15	-.219	.228	.050	.172	1.863	11.715	1.129	1.518	2.745	.687	-.626	-.038	-.004	.424	4.989
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	B	B	Y	Y	B	B	Y	Y	M	Y	S	Y	Y	B	B
	B	B	B	B	B	B	B	B	A	B	I	B	B	B	B
	C	L	O	O	O	O	V	R	T	S	B	O	O	O	O
	O	O	3	3	6	6	O	E	H	C		6	6	5	6
	N	C	5	5	7	2	C	A		I		3	3	O	6
	C	U	A	B			R	D		N		B	C	B	
	P	S					T	R		R					
								T		T					

Table 3. (continued)
Maternally Nonemployed

1	.554														
2	-.008	.363													
3	.025	.028	.144												
4	-.037	.039	-.005	.215											
5	-.193	.222	.023	.80	2.800										
6	-1.013	1.627	.039	.394	8.877	134.029									
7	.020	.828	.250	.048	1.328	11.200	16.890								
8	-.100	.778	.202	.080	1.228	10.853	10.908	14.418							
9	-.058	1.220	.290	.484	2.289	16.518	16.845	16.940	45.720						
10	-.040	.585	.138	.119	.875	8.116	8.151	8.205	14.558	11.298					
11	.158	.108	-.008	-.003	-.361	-1.416	-1.128	-.059	-.161	-.889	5.234				
12	-.010	-.035	-.007	-.002	-.109	-.727	-.268	-.238	-.374	-.161	.025	.106			
13	-.008	-.042	-.009	.008	-.095	-.455	-.376	-.346	-.479	-.242	-.032	.054	-.101		
14	-.046	.052	-.003	.044	.285	1.687	.271	.259	.599	.071	.019	-.020	-.020	.101	
15	-.202	.166	-.012	.124	1.895	11.434	1.269	1.911	2.125	.902	-.132	-.124	-.095	.568	4.684
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	BBCONCP	BBLOCUS	YBO35A	YBO35E	BBO067	BBO062	YBVOCRT	YBREADRT	MATH	YBSCINRT	SIB	YBO63B	YBO63C	BBO50B	BBO66

Table 4

Summary - Single Sample Models

	Maternally Employed				Maternally Unemployed		
Model	Chi-Square	df	comparison	Δ	Chi-square	comparison	Δ
1	1140.98	105	-----	---	1009.25	------	---
2	111.98	79	1-2	.902	101.23	1-2	.900

Table 5

Single Sample Model #2

Measurement Model:

Indicator	Maternally Employed Factor loading	(se)	Maternally Nonemployed Factor loading	(se)
Self-concept	-.043	(.141)	-.242	(.077)
Locus of control	1.000*	-	1.000*	-
At ease - English class	.488	(.321)	.621	(.396)
At ease - Math class	1.000*	-	1.000*	-
Ed./Occu. aspirations	.145	(.019)	.162	(.021)
Lowest schooling	1.000*	-	1.000*	-
Vocabulary	1.176	(.084)	1.278	(.103)
Reading	1.030	(.071)	1.263	(.096)
Math	1.765	(.124)	2.064	(.170)
Science	1.000*	-	1.000*	-
# of siblings	1.000*	-	1.000*	-
Man achieves	.809	(.158)	.681	(.163)
Woman in home	1.000*	-	1.000*	-
Schooling mother wants	.133	(.200)	.174	(.028)
Mother's plans	1.000*	-	1.000*	-

* - Fixed reference indicators

Structural Model:

Structure Coefficient	Maternally Employed Estimate	(se)	Maternally Nonemployed Estimate	(se)
Siblings > Self-Concept	-.025*	(.013)	.024*	(.016)
Siblings > Acad Task Conf.	-.007	(.009)	.001	(.005)
Siblings > Ed/Occu Aspirations	-.062	(.185)	-.491	(.173)
Sex Role > Self-Concept	-.824*	(.212)	-.491*	(.173)
Sex Role > Acad Task Conf.	-6.488*	(2.550)	-4.143*	(2.024)
Mother's Acad. Influence > Self Concept	.085*	(.025)	.070*	(.025)
Mother's Acad. Influence > Ed/Occu. Aspirations	4.067*	(.574)	3.654*	(.563)
Self-Concept > Achievement	5.695*	(.968)	1.444*	(.281)
Acad Task Conf. > Achievement	6.921	(13.747)	-12.792*	(8.086)
Ed/Occu. Aspirations > Achievement	-.111	(.160)	.190*	(.079)

* - Significant estimate ($p < .05$)

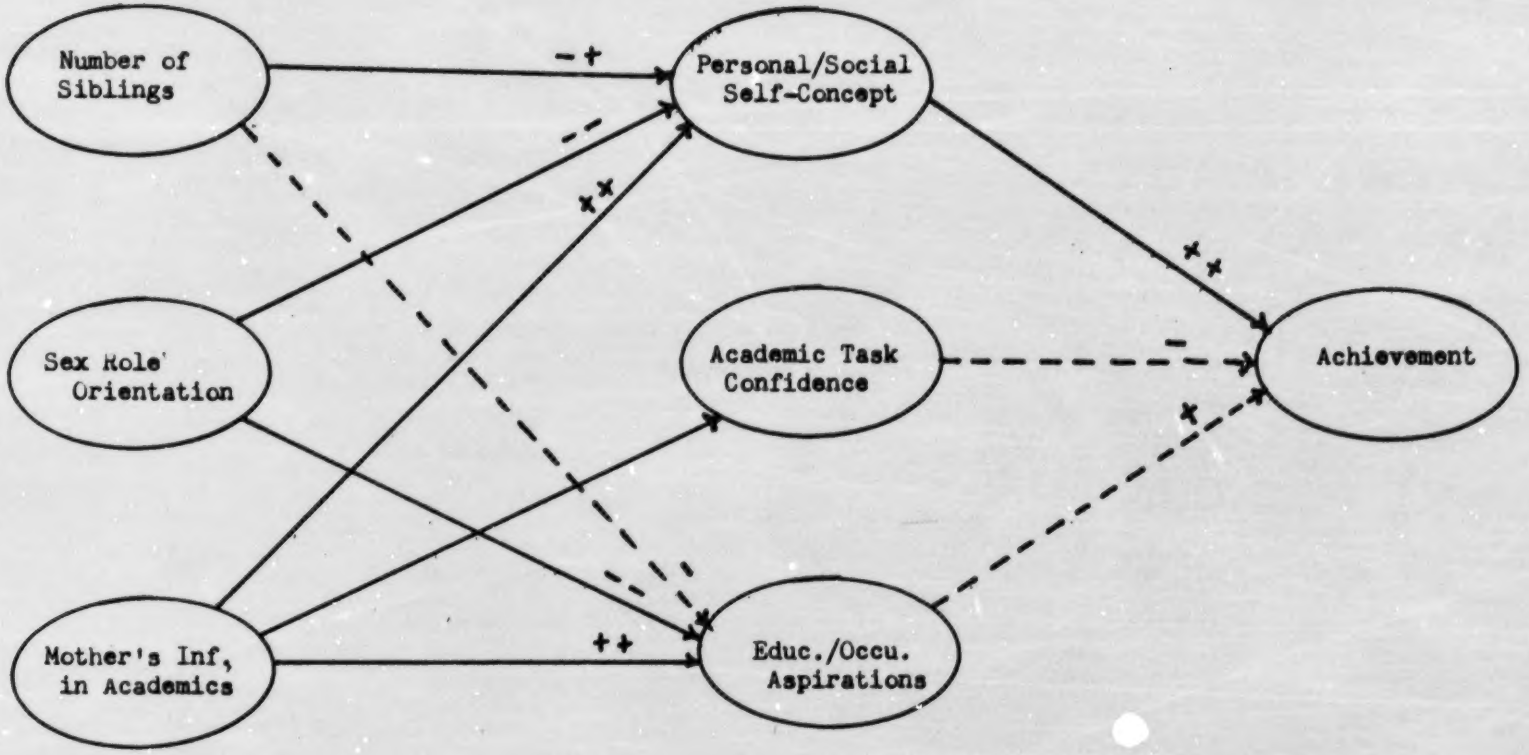

Figure 2. Significant relationships as estimated by single samples full LISREL model. First sign indicates direction of relationship for maternally employed group; second indicates relationship for nonemployed group. Dashed line represents significant path for nonemployed group only.

Table 6

A Summary of Multiple Sample Models

Model	Equality Constraints	Chi-Square	df	Comparison	Δ
1	Measurement Error	2179.33	225	---	--
2	Global Equality	273.54	199	1-2	.874